

WHAT IS CLAIMED IS:

1. A blowing agent composition comprising:
a hydrofluorocarbon or at least one compound selected from the group
5 consisting of: propane, n-butane, isobutene, n-pentane, isopentane,
neopentane, cyclopentane, acetone, dimethyl ether, and inert gases; an acid;
and
optionally, water.
- 10 2. The blowing agent according to claim 1, wherein said hydrofluorocarbon
is present in an amount between about 1 to 99 weight percent based
on the amount of said blowing agent, said acid is present in an
amount between about 1 to 99 weight percent based on the amount of
15 said blowing agent, and said water is present in an amount between
about 0 to 98 weight percent based on the amount of said blowing
agent.
- 20 3. The blowing agent according to claim 2, wherein said hydrofluorocarbon
is present in an amount between about 40 to 95 weight percent based
on the amount of said blowing agent, said acid is present in an
amount between about 5 to 60 weight percent based on the amount of
said blowing agent, and said water is present in an amount between
about 0 to 20 weight percent based on the amount of said blowing
25 agent.
- 30 4. The blowing agent according to claim 3, wherein said hydrofluorocarbon
is present in an amount between about 70 to 90 weight percent based
on the amount of said blowing agent, said acid is present in an
amount between about 10 to 30 weight percent based on the amount
of said blowing agent, and said water is present in an amount between

about 0 to 5 weight percent based on the amount of said blowing agent.

- 5 5. The blowing agent according to claim 1, wherein said hydrofluorocarbon
is at least one selected from the group consisting of:
pentafluoropropane isomers (HFC-245), difluoromethane (HFC-32);
difluoroethane isomers (HFC-152); trifluoroethane (HFC-143);
tetrafluoroethane isomers (HFC-134); pentafluoroethane isomers
(HFC-125); hexafluoropropane isomers (HFC-236);
10 heptafluoropropane isomers (HFC-227); pentafluorobutane isomers
(HFC-365); fluoroethane isomers (HFC-161); difluoropropane
isomers (HFC-272); trifluoropropane isomers (HFC-263);
tetrafluoropropane isomers (HFC-254); fluoropropane isomers (HFC-
281); hexafluorobutane isomers (HFC-356); decafluoropentane
15 isomers (HFC-43-10mee); chlorodifluoroethane isomers (HCFC-22);
dichlorofluoroethane isomers (HCFC-141b); dichlorotrifluoroethane
isomers (HCFC-123); chlorotetrafluoroethane isomers (HCFC-124);
perfluoroethane; perfluoropropane; perfluorobutane;
perfluorocyclobutane; dichloropropane and difluoropropane.
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6. The blowing agent according to claim 1, wherein said hydrofluorocarbon
is 1,1,1,3,3-pentafluoropropane (HFC-245fa).
- 25 7. The blowing agent according to claim 1, wherein said acid is at least one
acid selected from the group consisting of: mono functional
carboxylic acids, di functional carboxylic acids, and hydroxy acids.
8. The blowing agent according to claim 7, wherein said mono functional
carboxylic acid is at least one acid selected from the group consisting
30 of: C₁ to C₆ mono functional carboxylic acids.

9. The blowing agent according to claim 8, wherein said C₁ to C₆ mono functional carboxylic acids are at least one selected from the group consisting of: formic acid, acetic acid, propionic acid, n-butyric acid, isobutyric acid, n-valeric acid, methylethylacetic acid, trimethylacetic acid (pivalic acid), n-caproic acid, methyl-n-propylacetic acid, 3-methylpentanoic acid, isobutylacetic acid, dimethylethylacetic acid, methylisopropylacetic acid, and t-butylacetic acid.
10. The blowing agent according to claim 7, wherein said di functional carboxylic acid is at least one acid selected from the group consisting of: C₁ to C₆ di functional carboxylic acids.
11. The blowing agent according to claim 10, wherein said C₁ to C₆ di functional acids are at least one selected from the group consisting of: oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, methylsuccinic acid, dimethylmalonic acid, β-methylglutaric acid, ethylsuccinic acid, α,α-dimethylsuccinic acid, isopropylmalonic acid, fumaric acid, and maleic acid.
12. The blowing agent according to claim 7, wherein said hydroxy acid is at least one acid selected from the group consisting of: C₁ to C₆ hydroxy acids.
13. The blowing agent according to claim 12, wherein said C₁ to C₆ hydroxy acids are at least one selected from the group consisting of: hydroxyformic acid, hydroxyacetic acid, β-hydroxypropionic acid, lactic acid (α-hydroxypropionic acid), glycolic acid, glyceric acid, tartaric acid, malic acid, diglycolic acid, erythronic acid, α-hydroxybutyric acid, γ-hydroxybutyric acid, dl-threo-2,3-dihydroxybutyric acid, dl-erythro-2,3-dihydroxybutyric acid, δ-

hydroxyvaleric acid, α -hydroxy- α -methylbutyric acid, β -hydroxyisovaleric acid, 2,3-dihydroxypentanoic acid, α -hydroxycaproic acid, ϵ -hydroxycaproic acid, α -hydroxy- α -methylvaleric acid, β , β , β -trimethylactic acid, 2,3-dihydroxyhexanoic acid, citric acid, and gluconic acid.

14. The blowing agent according to claim 1, wherein said acid is formic acid.

15. A method of preparing polyurethane or polyisocyanurate foam compositions comprising reacting and foaming a mixture of at least one polyol and isocyanate which react to form polyurethane or polyisocyanurate foams in the presence of a blowing agents which comprises:

a hydrofluorocarbon or at least one compound selected from the group consisting of: propane, n-butane, isobutene, n-pentane, isopentane, neopentane, cyclopentane, acetone, dimethyl ether, and inert gases;

an acid; and

optionally, water.

16. The method according to claim 15, wherein said hydrofluorocarbon is present in an amount between about 1 to 99 weight percent based on the amount of said method, said acid is present in an amount between about 1 to 99 weight percent based on the amount of said method, and said water is present in an amount between about 0 to 98 weight percent based on the amount of said method.

17. The method according to claim 16, wherein said hydrofluorocarbon is present in an amount between about 40 to 95 weight percent based on the amount of said method, said acid is present in an amount between

about 5 to 60 weight percent based on the amount of said method, and said water is present in an amount between about 0 to 20 weight percent based on the amount of said method.

5 18. The method according to claim 17, wherein said hydrofluorocarbon is present in an amount between about 70 to 90 weight percent based on the amount of said method, said acid is present in an amount between about 10 to 30 weight percent based on the amount of said method, and said water is present in an amount between about 0 to 5 weight percent based on the amount of said method.

10 19. The method according to claim 15, wherein said hydrofluorocarbon is at least one selected from the group consisting of: pentafluoropropane isomers (HFC-245), difluoromethane (HFC-32); difluoroethane isomers (HFC-152); trifluoroethane (HFC-143); tetrafluoroethane isomers (HFC-134); pentafluoroethane isomers (HFC-125); hexafluoropropane isomers (HFC-236); heptafluoropropane isomers (HFC-227); pentafluorobutane isomers (HFC-365); fluoroethane isomers (HFC-161); difluoropropane isomers (HFC-272);

15 trifluoropropane isomers (HFC-263); tetrafluoropropane isomers (HFC-254); fluoropropane isomers (HFC-281); hexafluorobutane isomers (HFC-356); decafluoropentane isomers (HFC-43-10mee); chlorodifluoroethane isomers (HCFC-22); dichlorofluoroethane isomers (HCFC-141b); dichlorotrifluoroethane isomers (HCFC-123);

20 chlorotetrafluoroethane isomers (HCFC-124); perfluoroethane; perfluoropropane; perfluorobutane; perfluorocyclobutane; dichloropropane and difluoropropane.

25 20. The method according to claim 16, wherein said hydrofluorocarbon is

30 1,1,1,3,3-pentafluoropropane (HFC-245fa).

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21. The method according to claim 15, wherein said acid is at least one acid selected from the group consisting of: mono functional carboxylic acids, di functional carboxylic acids, and hydroxy acids.
22. The method according to claim 15, wherein said acid is formic acid.
23. The method according to claim 15, wherein said blowing agent is present in an amount between about 1 to 60 parts of said blowing agent per 100 parts of said polyol.
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24. The method according to claim 23, wherein said blowing agent is present in an amount of between about 5 to 35 parts by weight of said blowing agent per 100 parts by weight of polyol.
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25. A closed cell polyurethane or polyisocyanurate foam composition prepared from a polymer foam formulation comprising a blowing agent composition comprising:
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- a hydrofluorocarbon or at least one compound selected from the group consisting of: propane, n-butane, isobutene, n-pentane, isopentane, neopentane, cyclopentane, acetone, dimethyl ether, and inert gases;
 - an acid; and
 - optionally, water.
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26. A premix of a polyol and a blowing agent wherein said blowing agent comprises:
- 30
- a hydrofluorocarbon or at least one compound selected from the group consisting of: propane, n-butane, isobutene, n-pentane, isopentane, neopentane, cyclopentane, acetone,

dimethyl ether, and inert gases;
an acid; and
optionally, water.